CHAPTER 1
PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

This joint environmental impact statement/environmental impact report (EIS/EIR) evaluates the impacts on the environment that could result from the proposed Bolinas Lagoon Ecosystem Restoration Project, which would involve the removal of up to 1.5 million cubic yards (cy) of sediment from the bottom of Bolinas Lagoon. This estuarine lagoon is in Marin County, California, 12 miles northwest of San Francisco (Figure 1-1). The lagoon is owned by Marin County and is administered by Marin County Open Space District (MCOSD) and also falls within the jurisdictional boundaries of the Gulf of the Farallones National Marine Sanctuary (GFNMS).

Authority for the study to restore tidal interchange in Bolinas Lagoon is found in Section 142 of the Water Resources Development Act (WRDA) of 1976 (P.L. [Public Law] 94-587), as amended by Section 705 of the WRDA of 1986 (P.L. 99-662). This statute authorized the Secretary of the Army to act through the Chief of Engineers to investigate the environmental restoration of Bolinas Lagoon. In 1996 the United States House of Representatives Committee on Transportation and Infrastructure directed the Chief of Engineers to study the potential for "ecosystem protection, enhancement and restoration and related purposes at Bolinas Lagoon, California" (Corps 1997a). This EIS/EIR is being written as part of the US Army Corps of Engineers (Corps) Bolinas Lagoon Ecosystem Restoration Feasibility Study (FS), which will evaluate the financial, environmental, and engineering feasibility of undertaking a sediment removal project in Bolinas Lagoon. The FS is hereby incorporated by reference.

This document has been prepared in accordance with the California Environmental Quality Act (CEQA) of 1970, California Public Resources Code (Cal. Pub. Res. Code) §§ 21000-21178.1, and implementing guidelines, California Code of Regulations title 14, §§ 15000-15387 (1999); Marin County Environmental Review Guidelines; National Environmental Policy Act (NEPA) of 1969, 42 United States Code (U.S.C.), §§

1-1 Project Location

4321-4370d; the Council on Environmental Quality (CEQ) regulations on implementing NEPA, 40 Code of Federal Regulations (CFR), Parts 1500-1508 (1998); and the National Marine Sanctuary Program Regulations, 15 CFR, Part 922, Subpart M.

The CEQA lead agency for the proposed project is the County of Marin. The NEPA lead agency is the Corps. A list of other federal, state, and local agencies that would be involved in the project approval and implementation process is provided in Chapter 7.

Marin County owns Bolinas Lagoon Open Space Preserve, and MCOSD administers it with the technical advice and support of the Bolinas Lagoon Technical Advisory Committee (BLTAC). MCOSD and the Corps of Engineers are jointly funding the study, which will examine the effects of remediation strategies that counteract the long-term effects of sedimentation and compare them with the alternative of taking no action against sedimentation.

1.2 Purpose and Need

1.2.1 Need for the Project

Bolinas Lagoon fulfills a vital function in the California coastal ecosystem: it provides productive and diverse estuarine habitat for fish, waterfowl, shorebirds, marine mammals, and other wildlife and serves as an important stopover point for birds on the Pacific Flyway. Bolinas Lagoon has been filling in at an accelerated rate as a result of human activity since European colonization, and the mouth of the lagoon is predicted to begin closing intermittently within the next 50 years. The result of these closures would be a disruption in the flow of water in the lagoon, and the lagoon's value as estuarine habitat would decline. Humans use the lagoon for recreation and research, and sensitive species of birds, fish, and marine mammals use it for foraging and breeding; all would suffer because of this decline in habitat volume.

Bolinas Lagoon is an example of an estuarine habitat that is rapidly disappearing along the Pacific Coast flyway; as such, it fulfills a vital function in the lifecycle of migratory and resident birds, marine mammals, marine and anadromous fish, and other plant and animal species. The lagoon provides habitat, feeding, and breeding areas for hundreds of migratory and resident species. The ecological function the lagoon serves has become increasingly important in the past century, as coastal wetlands in California have been lost through development. For the past 150 years, tidal prism, the volume of water entering and leaving the lagoon during a tidal cycle, declined at a noticeable rate. Potential tidal prism is defined as the volume of water that would enter and exit the lagoon in a tidal cycle if the elevation of high tide and low tide within the lagoon matched the elevation of high tide and low tide in the ocean, where the water surface rises and falls uniformly. Effective tidal prism is defined as the volume of water that actually enters and exits the lagoon during a tidal cycle. Flow alterations stemming from inlet size, friction within the lagoon, wind, and other factors cause the effective tidal prism to be less than the potential tidal prism.

According to estimates by the Corps, the lagoon has lost nearly 40 percent of its effective tidal prism since 1968 (Table 1-1) and will continue to lose tidal prism in the immediate future, although at a slower rate (Table 1-2). The loss of tidal prism is reflected by more subtle changes in volume and acreage of habitat types in the lagoon.

Table 1-1
Measured Lagoon Tidal Prism and Habitat Changes[1]

Year	Potential Tidal Prism (cy)	Effective Tidal Prism (cy)	Intertidal Habitat (cy)	Subtidal Habitat (cy)	Upland Habitat (Acres)
1968	6,196,800	5,213,800	5,580,300	641,300	156
1998	4,908,600	3,212,900	3,584,700	523,300	238
Change	-1,288,200	-2,000,900	-1,995,600	-118,000	+82
% Change	-21%	-38%	-35%	-18%	+52%

Source: Corps 2001
[1]Volumes are estimated to be accurate to the nearest thousand.

Table 1-2
Predicted Lagoon Tidal Prism and Habitat Changes[1]

Year	Potential Tidal Prism (cy)	Effective Tidal Prism (cy)	Intertidal Habitat (cy)	Subtidal Habitat (cy)	Upland Habitat (acres)
1998	4,908,600	3,212,900	3,584,700	523,300	238
2058	3,682,200	1,741,100	1,677,400	410,600	317
Change	-1,226,400	-1,471,700	-1,907,300	-112,700	+79
% Change	-25%	-46%	-53%	-22%	+33%

Source: Corps 2001
[1] Volumes are estimated to be accurate to the nearest thousand.

1.2.2 Purpose of the Project

The goals of this project are to increase tidal volume and to restore intertidal and subtidal habitat in Bolinas Lagoon to historic levels, in a manner that prevents the need for regular maintenance dredging during the project period. The lead agencies have evaluated the best available bathymetric data and aerial photographs of the lagoon to develop alternatives that would shift the lagoon's intertidal and subtidal volumes back to a point that is closer to where the lagoon would have been without the accelerated sedimentation rates of the past 150 years. Historical data helped to keep the design parameters within the historical context. That is, the alternatives were designed in a manner that allowed changes in intertidal and subtidal volume to be kept proportional so as not to create an "unnatural" condition in the lagoon. With these changes, the lagoon would have larger volumes of intertidal and subtidal habitat and increased tidal flow, which would in turn delay the potential closure of the inlet and preserve the lagoon's valuable intertidal and subtidal habitats. Additional benefits of this project include preserving the lagoon for recreational uses and scenic value.

This project would address the impact of human activity on the lagoon and is intended to result in a lagoon that is neither fixed and unchanging nor in need of regular

maintenance. Upon completion of the project, the lagoon would remain subject to natural variations in tidal volume, sediment input, seismic activity, and weather conditions, but with a lower baseline of sediment than has existed since the mid 1950s.

1.2.3 Long-Term Project Implementation

This EIS/EIR is intended to document the most likely environmental consequences of the Bolinas Lagoon Ecosystem Restoration project. This EIS/EIR also identifies specific mitigation measures which the lead agencies would commit to implementing, in compliance with NEPA and CEQA. The environmental impacts described in this document, as limited by the project design and mitigation measures, address various scenarios of environmental consequences of the project. Nevertheless, because the project feasibility is still under study, it is possible that project construction or implementation could change, which could result in changes to project impacts.

In addition, because the project could take approximately 9 years to complete, local stakeholders are working with the project sponsors to prepare an Adaptive Management Plan (AMP), discussed in more detail in Section 2.3.2, that would provide for interim monitoring and mitigation to increase project efficiency and limit adverse environmental impacts during project construction.

Because the AMP would be intended to further limit potential environmental impacts of the project, no impacts beyond those described in this EIS/EIR would be anticipated and it is unlikely that further environmental documentation would be necessary to implement AMP recommendations.

If the implementation of the AMP were to result in recommendations to the lead agencies that would exceed the parameters of the project as described in this EIS/EIR, or potentially result in impacts beyond those identified in this EIS/EIR, the lead agencies would retain the discretion of adopting or refusing these recommendations. Adoption of any recommendations that substantially change the scope of the project or the mitigations necessary to limit adverse impacts would require supplemental NEPA/CEQA documentation. This documentation could take the form of an Environmental Assessment/Initial Study, Supplemental EIS/EIR, or some other document tiered off this EIS/EIR.

1.3 Project Area

The estuary Bolinas Lagoon covers 1,100 acres (MCOSD 1996). The lagoon is a haven for wildlife, including dozens of species of birds, fish, and marine mammals. It is roughly triangular and is approximately three miles long by one mile wide. Much of the lagoon bottom is exposed at low tide.

Estuarine lagoons generally have a relatively short life span in geologic terms. The natural progression of such lagoons is to fill in and gradually become transformed, first into wetland habitat and then into upland habitat. Geophysicists have estimated that seismic activity along the San Andreas fault has increased the lagoon's tidal volume at

sufficiently frequent intervals to keep the lagoon open for far longer than it would have been without such influences. Section 3.4 discusses the geological setting of Bolinas Lagoon, particularly the lagoon's proximity to the San Andreas Fault.

The watershed surrounding the lagoon, which is primarily in public ownership, is mostly undeveloped land, open to the public for recreation and environmental education (MCOSD 1996). Marin County limits residential and commercial development on the western side of the county, so there is little development in the area surrounding the lagoon. The two unincorporated residential communities within the watershed, Stinson Beach and Bolinas, are on the southeastern and southwestern shores of the lagoon, respectively.

East of the lagoon the land rises fairly rapidly to Bolinas Ridge, 1,800 feet above sea level; west of the lagoon the land rises less rapidly to the broad expanse of Bolinas Mesa. A number of creeks drain the east side of the watershed, but most of the western and northern sections of the watershed drain into Pine Gulch Creek, which enters the lagoon just north of downtown Bolinas.

In 1998, the United States Fish and Wildlife Service (USFWS) designated Bolinas Lagoon as a Wetland of International Importance, consistent with protocols established at the Convention on Wetlands of International Importance held in Ramsar, Iran, in 1971 (Ramsar 2000). The California State Assembly has also recognized Bolinas Lagoon's local and regional ecological importance (California Assembly 1997). In 1981 Bolinas Lagoon was designated as part of the GFNMS, which is administered by the National Oceanographic and Atmospheric Administration (NOAA).

For the purposes of this EIS/EIR, the lagoon is considered to have three types of habitat: Upland habitat, which is not usually covered by water at high tide; intertidal habitat, which may be exposed at low tide but covered by water at high tide; and subtidal habitat, which is always under water. Lagoon habitats are defined in relation to elevation above or below mean sea level, such that upland habitat is all areas in the lagoon above a certain elevation, subtidal habitat is all areas of the lagoon below a certain elevation, and intertidal habitat is the area above the subtidal boundary and below the upland boundary. Habitat acreages and volumes have been calculated based on 1998 elevations; therefore, under these conditions, upland habitat is from 2.54 to 7.00 feet above the National Geodetic Vertical Datum (ft NGVD), intertidal habitat is from -1.36 to 2.54 ft NGVD, and subtidal habitat is anything below -1.36 ft NGVD. However, as tidal prism in the lagoon changes, so will water elevations change, and habitat boundaries will have to be recalculated as the project progresses. Upland habitat is primarily measured in acres; intertidal and subtidal habitat are often measured in volume by cubic yards because they are calculated with upper and lower boundaries.

Estuarine lagoons sometimes close if the flow of water through the lagoon opening, or inlet, is not powerful enough to prevent the accumulation of sediment in the inlet. This

flow of water through the lagoon opening is a function of the tidal prism, the width of the inlet, the force of the tide and wave action, and the volume and velocity of freshwater entering the lagoon from elsewhere. Figures 1-2 and 1-3 show some of the changes in the lagoon's morphology, or functional shape, over the past 150 years. The Corps has evaluated the current rate of tidal prism loss in the lagoon and has produced an estimated closure index, based on the history of the lagoon and estimates of future tidal prism loss. Based on these studies, the Corps estimates that the lagoon could close under certain circumstances as soon as 2058 if no action is taken. This closure would likely be temporary, but even such temporary closures reduce tidal exchange and affect habitat levels. If the lagoon were to close permanently, all tidal exchange would necessarily stop, and vital habitat for sensitive species would be lost. Section 3 of this EIS/EIR includes a detailed discussion of the sensitive species that reside in or stop over in the lagoon.

Resource categories have been identified by the community, Marin County, and the Corps as being of particular importance and include biological resources (terrestrial, aquatic, wetlands, and sensitive species), cultural resources (including archaeological sites along the shores of the lagoon), water quality, and recreational opportunities in the lagoon and the watershed (Figure 1-4).

1.4 Use of a Joint CEQA / NEPA Document

This joint EIS/EIR fulfills the requirements of CEQA and NEPA to assess the potential environmental impacts of the proposed sediment removal project. Both CEQA and NEPA encourage use of a joint EIS/EIR. CEQA encourages the use of a joint document to meet the requirements of both CEQA and NEPA (Cal. Pub. Res. Code § 2103.7, CEQA Guidelines § 15226). NEPA requires federal agencies to cooperate with state and local agencies to the fullest extent possible to reduce duplication among NEPA, state, and local requirements, including joint environmental impact statements (40 CFR § 1506.2).

Requirements of an EIR and an EIS are similar and generally parallel each other, but they do differ. For example, CEQA allows alternatives to the proposed project to be analyzed in less detail, while NEPA requires a substantially similar level of detail in the analysis for each alternative. CEQA requires a monitoring plan for identified mitigation measures to be provided in the findings, while NEPA does not. CEQA requires identifying an environmentally superior alternative, and NEPA requires identifying an environmentally preferable alternative. Under CEQA, socioeconomic impacts are not typically considered, except as they may cause a secondary physical impact, while under NEPA, they are discussed. NEPA also requires a discussion of the relationship between short-term uses of the human environment and the maintenance and enhancement of long-term productivity. All of these requirements are addressed in this joint document.

1-2 Current Configuration of Bolinas Lagoon

1-3 Historic Structure of Bolinas Lagoon

1-4 Bolinas Lagoon and Watershed

1.4.1 Intended Uses of EIS/EIR

The lead agencies, in consultation with the BLTAC and the Habitat Evaluation Expert Panel (HEEP), will develop an AMP following completion of this EIS/EIR. The AMP will be designed to track potential impacts of the project and to redesign the project as necessary to limit impacts described in this EIS/EIR.

Future management planning activities concerning Bolinas Lagoon, such as updates of the Bolinas Lagoon Management Plan, would also be likely to use the EIS/EIR and the technical appendices as references or guides.

1.5 Public Involvement Process

Public involvement is a key part of the EIS/EIR process. Methods to involve the public in the EIS/EIR process have included or will include the following:

- Publishing notices of public meetings in newspapers with a wide circulation and encouraging written comments;
- Publishing a notice of intent (NOI) in the Federal Register on April 9, 1998 (63 Fed. Reg. 17392), followed by a notice of preparation (NOP) on April 5, 2000. These notices were sent to the California State Clearinghouse for distribution to state agencies. Their purpose is to notify the public that an EIS/EIR will be prepared and considered (40 CFR § 1508.22). These notices also solicited guidance from these agencies as to the scope and content of the environmental information to be included in the EIS/EIR (CEQA Guidelines § 15375). The California Clearinghouse Number referencing the NOP is #2000042055. Appendix A contains copies of the NOI and NOP.
- Sending scoping letters and project information to public agencies, public interest groups, and individuals;
- Holding a public hearing on scoping for the FS and development of the EIS/EIR on April 16, 1998, at the Stinson Beach Community Center; this meeting was attended by agency representatives and members of the public.
- Holding public informational meetings at the Stinson Beach Community Center on November 4, 1999, and November 30, 2000, and at the Bolinas Community Center on December 2, 2000, in order to keep the local community informed of the status of the FS;
- Creating and maintaining a mailing list to disseminate information about the decision-making process;
- Making the draft and final EIS/EIR available to the public online at http://www.spn.usace.army.mil/projects/bolinas.html; and
- Holding two public hearings on the draft EIS/EIR and providing a 45-day comment period.

Public Review

The public review period for this draft EIS/EIR is 45 days under both CEQA and NEPA; comments will be responded to in a final EIS/EIR. NEPA provides for a 30-day no action period after publication of the final EIS.

Draft EIS/EIR

The public is invited to review and comment on this draft EIS/EIR. The Corps and Marin County will publish a notice of availability (NOA) in the Federal Register and in the local press. Public notices will be mailed to those on the mailing list, and Marin County will file a notice of completion (required under CEQA) with the State Office of Planning and Research. On the day the notice of completion is filed, the 45-day public comment period will begin, which will provide the public with an opportunity to review the document and to offer comments.

The public is invited to send written comments on the draft EIS/EIR to Tim Haddad, Marin County Community Development Agency, 3501 Civic Center Drive, San Rafael, CA 94903, and to Roger Golden, US Army Corps of Engineers, San Francisco District, 333 Market Street, 7th Floor, San Francisco, CA 94105.

Two public hearings will be held during the 45-day review period to hear comments on the draft EIS/EIR. The time and place of the hearings will be announced in the media and are noted in the transmittal letter accompanying this document.

Final EIS/EIR

A final EIS/EIR, which discusses the comments received on the draft EIS/EIR, will be published and made available for review. A NOA of the final EIS/EIR will be published in the Federal Register and in a public notice.

During the NEPA 30-day no action period, the public and agencies may comment on the adequacy of responses to comments and the final EIS/EIR. After that time, the Corps would sign a record of decision (ROD), detailing its decision regarding the proposed project. This 30-day period will also fulfill Marin County's requirement for a final EIR public review and comment period before the Planning Commission recommends that the Board of Supervisors certify the Final EIS/EIR as complete and adequate. The Planning Commission will consider its recommendation for certifying the final EIS/EIR in a public meeting before recommending that the Board of Supervisors take action on the project. The final EIR will be presented to the Marin County Planning Commission and the Marin County Parks, Open Space and Cultural Commission, for approval, then to the Board of Directors of MCOSD for certification during or after the 30-day federal review period.